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From: Commander, Western Division, Naval Facilities Engineering Command
To: Distribution

Subj: PHASE I CHARACTERIZATION REPORT AT NAVAL AIR STATION, MOFFETT
FIELD

Encl: (1) Outline for Moffett Phase I Characterization Report

1. Enclosure (1) is the proposed Outline for the Moffett Phase I Characterization Report.
It is requested that you review and comment on the enclosed outline by 12 March 1990.

2. Should you have any questions regarding this matter, the point of contact is Commander,
Western Division, Naval Facilities Engineering Command (Attn: Mr. Stephen Chao, Code
1813SC, (415) 877-7512).

Original signed by:

RICHARD SERAYDARIAN
By direction

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OUTLINE FOR MOFFETT PHASE I CHARACTERIZATION REPORT

EXECUTIVE SUMMARY

1.0 Introduction

- 1.1 Purpose of Report (Regulatory requirements, objectives and scope)
- 1.2 Report Organization
- 1.3 Project Background
 - 1.3.1 Moffett Field Location and Description
 - 1.3.2 Moffett Field Environs
- 1.4 Previous Studies (ERM-West, Initial Assessment and Confirmation Steps etc.; this should be fairly detailed with tables summarizing significant findings pertaining to Moffett work only.)

2.0 Remedial Investigation Activities (Include technical approach)

- 2.1 Introduction
- 2.2 Aerial Photo and Historical Data Review
- 2.3 Field Investigation Activities
 - 2.3.1 Surface Geophysics
 - 2.3.2 Surface Water and Sediment Investigations
 - 2.3.3 Soil Gas Surveys
 - 2.3.4 Shallow Soil and Soil Boring Investigations
 - 2.3.5 Subsurface Geophysics

- 2.3.6 Monitoring Well Installations
- 2.3.7 Surveying
- 2.3.8 Water Level Measurements and Aquifer Testing
- 2.3.9 Ground Water Sampling
- 2.4 Laboratory Analyses (Brief written description of CLP protocols and tables showing analyses/matrix)
- 2.5 Public Health Evaluation (include in here a discussion of potentially applicable criteria for protection of human health and the environment <ARARS>.)
- 3.0 Moffett Field Characteristics Overview (This section is a general discussion and interpretation of site-wide features, findings from other reports i.e. Canonie, HLA etc.)
 - 3.1 Surface Features (topography, physiography, soils, hydrology, meteorology)
 - 3.2 Geology (marine-alluvial facies characteristics, stratigraphy, site-wide cross sections and/or fence diagrams)
 - 3.3 Hydrogeology (multiple aquifers, flow direction, hydraulic connections among aquifers)
 - 3.4 Water Quality (Include background levels where applicable, offsite contamination and its effect on the site)
 - 3.4.1 Surface Water
 - 3.4.2 Ground Water
 - 3.4.3 Salt Water Intrusion
- 4.0 Site 1 - Runway Landfill Characteristics

- 4.1 Site Description and Historical Use (include table of chemicals used at each site.)
- 4.2 Investigation Objectives
- 4.3 Landfill Configuration (geophysical survey and aerials)
- 4.4 Hydrogeology (includes stratigraphy from boring and geophysical logs, pertinent cross sections, slug and perm tests, information obtained on local conditions within A-aquifer)
- 4.5 Nature and Extent of Contamination (Include contaminant levels, areal and vertical extent and any significant temporal changes in quarterly monitoring results; tables should include samples from each matrix with concentrations exceeding detection limits.)
 - 4.5.1 Sources (including leachate)
 - 4.5.2 Surface Water and Stream Sediments (compare high and low-flow conditions)
 - 4.5.3 Soils (monitoring and leachate soils)
 - 4.5.4 Ground Water (quarterly sampling; reiterate CLP protocols for metals analyses to explain elevated detection limits for heavy metals)

5.0 Site 2 - Golf Course Landfill Characteristics

- 5.1 Site Description and Historical Use
- 5.2 Investigation Objectives
- 5.3 Landfill Configuration (geophysical survey and aerials)

- 5.4 Hydrogeology (includes stratigraphy from boring and geophysical logs, pertinent cross sections, slug and perm tests, information obtained on local conditions within A-aquifer)
- 5.5 Nature and Extent of Contamination
 - 5.5.1 Sources (include discussion of leachate composition)
 - 5.5.2 Surface Water and Sediments (compare high and low-flow conditions)
 - 5.5.3 Soils (monitoring and leachate soils)
 - 5.5.4 Ground Water (quarterly sampling)
- 6.0 Site 3 - Marriage Road Ditch
 - 6.1 Site Description and Historical Use
 - 6.2 Investigation Objectives
 - 6.3 Drainage Configuration
 - 6.4 Hydrogeology (include stratigraphy from geophysical and soil borings, monitor well borings; prepare pertinent cross sections; water levels in A, B and C aquifers)
 - 6.5 Nature and Extent of Contamination
 - 6.5.1 Sources
 - 6.5.2 Surface Water and Sediments (compare high and low flow conditions)
 - 6.5.3 Soils (include soil gas survey results and soil analytical from soil borings and monitor wells;)

6.5.4 Groundwater (quarterly monitoring, comparisons
of aquifers)

7.0 Sites 4 - Abandoned Waste Water Holding Ponds

7.1 Site Description and Historical Use

7.2 Investigation Objectives

7.3 Size and Configuration

7.4 Hydrogeology (strat from geophysical and MW boring
logs; water levels from three aquifers)

7.5 Nature and Extent of Contamination

7.5.1 Sources

7.5.2 Soils (analytical from MW soils)

7.5.3 Ground Water (quarterly monitoring)

8.0 Site 5 - Fuel Farm Area

8.1 Site Description and Historical Use

8.2 Investigation Objectives

8.3 Size and Configuration

8.4 Hydrogeology

8.5 Nature and Extent of Contamination

8.5.1 Sources

8.5.2 Soils

8.5.3 Ground Water

9.0 Site 6 - Runway Apron

9.1 Site Description and Historical Use

9.2 Investigation Objectives

9.3 Size and Configuration

9.4 Hydrogeology (Use boring logs from others to describe)

9.5 Nature and Extent of Contamination

9.5.1 Sources

9.5.2 Groundwater

10.0 Site 7 - Hangars 2 and 3

10.1 Site Description and Historical Use

10.2 Investigation Objectives

10.3 Size and Configuration

10.4 Hydrogeology

10.5 Nature and Extent of Contamination

10.5.1 Sources

10.5.2 Soils

10.5.3 Groundwater

11.0 Site 8 - Waste Oil Transfer Area

11.1 Site Description and Historical Use

11.2 Investigation Objectives

11.3 Size and Configuration

11.4 Hydrogeology

11.5 Nature and Extent of Conatmination

11.5.1 Sources

11.5.2 Soils

11.5.3 Groundwater

12.0 Site 9 - Old Fuel Farm

12.1 Site Description and Historical Use

12.2 Investigation Objectives

12.3 Size and Configuration

12.4 Hydrogeology

12.5 Nature and Extent of Contamination

12.5.1 Sources

12.5.2 Soils

12.5.3 Groundwater

13.0 Site 10 - Runway Area

13.1 Site Description and Historical Use

13.2 Investigation Objectives

13.3 Size and Configuration

13.4 Hydrogeology

13.5 Nature and Extent of Contamination

13.5.1 Sources

13.5.2 Soils

13.5.3 Groundwater

14.0 Site 11 - Engine Test Area

14.1 Site Description and Historical Use

14.2 Investigation Objectives

14.3 Size and Configuration

14.4 Hydrogeology

14.5 Nature and Extent of Contamination

14.5.1 Sources

14.5.2 Soils

14.5.3 Groundwater

15.0 Site 12 - Fire Fighting Training Area

15.1 Site Description and Historical Use

15.2 Investigation Objectives

15.3 Size and Configuration

15.4 Hydrogeology

15.5 Nature and Extent of Contamination

15.5.1 Sources

15.5.2 Soils

15.5.3 Groundwater

16.0 Site 13 - Equipment Parking Area

16.1 Site Description and Historical Use

16.2 Investigation Objectives

16.3 Size and Configuration

16.4 Nature and Extent of Soil Contamination

17.0 Site 14 - Abandoned Tanks 19, 20, 67, and 68

17.1 Site Description and Historical Use

17.2 Investigation Objectives

17.3 Size and Configuration

17.4 Hydrogeology

17.5 Nature and Extent of Contamination

17.5.1 Sources

17.5.2 Soils

17.5.3 Groundwater

18.0 Site 18 - Dry Cleaners Sump No. 66

18.1 Site Description and Historical Use

18.2 Investigation Objectives

18.3 Size and Configuration

18.4 Nature and Extent of Soil Contamination

19.0 Site 19 - Leaking Tanks 2,14,43,and 53

19.1 Site Description and Historical Use

19.2 Investigation Objectives

19.3 Size and Configuration

19.4 Hydrogeology

19.5 Nature and Extent of Contamination

19.5.1 Sources

19.5.2 Soils

19.5.3 Groundwater

20.0 Contaminant Fate and Transport

20.1 Routes

20.2 Persistence

20.3 Migration

21.0 Preliminary Qualitative Risk Assessment

21.1 Receptor Survey

21.2 Qualitative Risk Assessment

22.0 Summary and Preliminary Conclusions

22.1 Nature and Extent of Contamination

22.2 Risk Assessment

22.3 Data Limitations and Recommendations for Further Work

Tables

Figures

Appendices



October 22, 1990

Mr. Steve Chao *MDM 10/26*
WESTDIV
Department of the Navy
Western Division, Naval Facilities
Engineering Command
Code 1142C, Post Office Box 727
San Bruno, California 94066-0720

Dear Mr. Chao:

SUBJECT: Phase I Characterization Report, NAS Moffett Field,
California; IT Project Number 409729 (A1T347).

Apparently some pages may be missing from your copy of the subject report. Enclosed are text pages 10-10 and 10-11 (Volume 1), and Tables 3.2-1 and 24.4 (three sheets; Volume 2).

I hope this has not caused any inconvenience.

Sincerely,

Bill Hamitt

for C. Keith Bradley
Project Manager

CKB/dav

Enclosure

Admin Record

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The most frequently detected compounds were the common laboratory contaminants acetone, and methylene chloride. In most cases, each detection was associated with method blank contamination. These compounds were found in all 10 wells that were sampled.

One well, W07-08(A2), contained elevated levels of organics which includes:

<u>Compound</u>	<u>Range (µg/l)</u>
1,1,1-Trichloroethane	5 to 8
1,2-Dichloroethane	5
1,2-Dichloroethanes (total)	14 to 25
Carbon tetrachloride	7 to 91
Chloroform	5 to 9
Tetrachloroethene	75 to 180
Trichloroethene	25 to 50

Well W07-08(A2) is immediately downgradient of the former Tank 43 location and the probable source of these VOCs is from that tank. The tank was recently removed by the Navy and sampling associated with the removal may confirm the source of this organic contamination in the ground water. Additional work is planned for Site 7 to assess the extent of this contamination.

Di-n-octyl phthalate was observed only once at 63.0 µg/l and is not considered indicative of ground water contamination.

Several metals were consistently above the quantitation limit. These elements and compounds are presented on Tables 10.4-5 and 10.4-6. Naturally occurring inorganic constituents in the soils (aluminum, calcium, sodium, potassium, and magnesium) are present in high quantities in the ground water. Sea water intrusion in the area has contributed to the natural degradation of the water quality. The naturally occurring elements and compounds will not be discussed in this text.

Metals found in the ground water samples above quantitation limits include arsenic, mercury, selenium, and iron. Arsenic was found in one sample from W07-16(C) at 10 µg/l. Mercury was found in one sample from W07-19(A1) at 0.7 µg/l. Selenium was found in four samples from W07-20(A2) at 5.0 µg/l to 7.8

µg/l. Iron was found in four samples and ranged from 105 µg/l to 2,060 µg/l. These levels are within the regional background range reported by the DWR (Table 3.5-1). Arsenic and mercury were found only one time each at different well locations and at very low levels, indicating that the detections are not indicative of ground water contamination. Selenium was found at only one location; however, it was found in four samples. It appears to be consistent within the one A2 subaquifer well but at a very low level. Selenium at very low levels was also found in a cross-gradient A2 subaquifer well at Site 5. As noted in Section 8.4, selenium is not found in nearby A1 subaquifer wells and the concentrations found are well below the background levels reported for the region by the DWR (Table 3.5-1).

Table 3.2-1. Baseline Element Concentrations of Soils in the NAS Moffett Field Area

Metal	USGS Range ^a (mg/kg)	Hetch- Hetchy ^b (mg/kg)	Mountain View Well 18 ^b (mg/kg)	Moffett Range ^c (mg/kg)	Whaler ^d (mg/kg)
Aluminum	70000			14,065 - 24,287	
Antimony	<1 - 10			4.8 - 54.4	0.4 - 1
Arsenic	6.5 - 10	5.6 - 6.3	5.9 - 11	1.2 - 8.8	0.4 - 1
Barium	700 - 5000			77.6 - 220.4	
Beryllium	<1	0.7 - 0.8	0.9 - 1.2	1.3 - 3.7	0.7 - 1.1
Cadmium	1 - 10	4	<1 - 3	0.5 - 3.5	
Calcium	18000 - 28000			9485 - 83,385	17 - 130
Chromium	100 - 2000	56 - 60	62 - 72	48.3 - 76.5	
Cobalt	15 - 70			12.2 - 18.6	15 - 28
Copper	30 - 700	44 - 47	39 - 44	24.1 - 56.7	
Iron	30000 - >100000			23,201 - 38,347	19 - 110
Lead	30 - 700	45 - 48	49 - 54	3.9 - 28.3	
Magnesium	15000 - >100000			11,417 - 19,567	
Manganese	500 - 7000			343 - 721	
Mercury	0.2 - 5.1	0.1	0.15 - 1.3	0.1 - 0.5	
Nickel	30 - 700	41 - 47	52 - 58	46.3 - 88.5	
Potassium	11000 - 16000			508 - 2846	
Selenium	<0.1 - 0.5	ND(0.3)	ND(0.3)		
Silver	0.7 - 5	0.3 - 0.8	<0.2 - 0.4	1.8 - 5.0	
Sodium	7000 - 100000			1,417 - 13,609	
Thallium	NA	ND(0.2)	ND(0.2)	0.2 - 0.6	
Vanadium	150 - 500			46.40 - 78.2	
Zinc	120 - 3500	100 - 110	100 - 110	54.5 - 104.1	31 - 93

NA - Range not available.

ND - All samples nondetect, reported value is the method detection limit.

^aTaken from USGS Professional Paper 1270, 1984. Data include samples from the contiguous United States.

^bRange from two samples, taken from Harding Lawson Associates 1987b.

^cRanges obtained as described in Section 3.2.2.

^dData from Harding Lawson Associates, 1987b.

Table 24.4-1. Clean Water Act Ambient Water Quality
Criteria for Consumption of Fish

Chemical Name	Fish Consumption Criterion (mg/l)
Acrolein	7.8×10^{-1}
Acrylonitrile	$6.5 \times 10^{-2(a)}$
Aldrin	$7.9 \times 10^{-8(a)}$
Antimony	4.5×10^1
Arsenic	$1.8 \times 10^{-5(a)}$
Arsenic (III) and Compounds	$6.9 \times 10^{-2}/3.6 \times 10^{-2}$
Benzene	$4.0 \times 10^{-2(a)}$
Benzidine	$5.3 \times 10^{-7(a)}$
Beryllium	$1.2 \times 10^{-4(a)}$
Bis 2-Chloroethyl Ether	$1.4 \times 10^{-3(a)}$
Bis 2-Chloroisopropyl Ether	4.4
Cadmium and Compounds	$4.3 \times 10^{-2}/9.3 \times 10^{-2}$
Carbon Tetrachloride	$6.9 \times 10^{-3(a)}$
Chlordane	$4.8 \times 10^{-7(a)}$
Chloroform	$1.6 \times 10^{-2(a)}$
Chromium III and Compounds	3.4
DDT	$2.4 \times 10^{-8(a)}$
Dibutyl Phthalate	1.5×10^2
Dichlorobenzenes	2.6
Dichlorobenzidine	$2.0 \times 10^{-5(a)}$
1,2-Dichloroethane (EDC)	$2.4 \times 10^{-1(a)}$
Dichloroethylenes	$1.9 \times 10^{-3(a)}$
1,3-Dichloropropene	1.4×10
Dieldrin	$7.6 \times 10^{-8(a)}$
Diethyl Phthalate	1.8×10^3
Dimethyl Phthalate	2.9×10
Dinitrotoluene	1.4×10^1
2,4-Dinitro-o-cresol	7.7×10^{-1}
2,4-Dinitrotoluene	$9.1 \times 10^{-3(a)}$
Diphenylhydrazine	$5.6 \times 10^{-4(a)}$
Di(2-ethylhexyl)Phthalate	5.0×10^1

Table 24.4-1 (Continued)

Chemical Name	Fish Consumption Criterion (mg/l)
Endosulfan	1.6×10^{-1}
Ethylbenzene	3.3
Fluoranthene	5.4×10^{-2}
Halomethanes	$1.6 \times 10^{-2(a)}$
Heptachlor	2.9×10^{-7}
Hexachlorobutadiene	5.0×10^{-2}
Hexachlorobenzene	$7.4 \times 10^{-7(a)}$
Hexachlorocyclohexane - alpha	$3.1 \times 10^{-5(a)}$
Hexachlorocyclohexane - beta	$5.5 \times 10^{-5(a)}$
Hexachlorocyclohexane - gamma	$8.3 \times 10^{-5(a)}$
Hexachlorocyclohexane - technical	$4.1 \times 10^{-5(a)}$
Hexachloroethane	8.7×10^{-3}
Isophorone	5.2×10^2
Manganese	1.0×10^{-1}
Mercury and Compounds	1.5×10^{-4}
N-Nitrosodibutylamine	$5.9 \times 10^{-4(a)}$
N-Nitrosodiethylamine	$1.2 \times 10^{-3(a)}$
N-Nitrosodimethylamine	$1.6 \times 10^{-2(a)}$
N-Nitrosodiphenylamine	$1.6 \times 10^{-2(a)}$
N-Nitrosopyrrolidine	$9.2 \times 10^{-2(a)}$
Nickel and Compounds	1.0×10^{-1}
Pentachlorobenzene	8.5×10^{-2}
Polychlorinated Biphenyls (PCBs)	$7.9 \times 10^{-8(a)}$
Polynuclear Aromatic Hydrocarbons	$3.1 \times 10^{-5(a)}$
2,3,7,8-TCDD	$1.4 \times 10^{-11(a)}$
1,2,4,5-Tetrachlorobenzene	$4.8 \times 10^{-5(a)}$
1,1,2,2-Tetrachloroethane	$1.1 \times 10^{-2(a)}$
1,1,2-Trichloroethane	$4.2 \times 10^{-2(a)}$
2,4,6-Trichlorophenol	$3.6 \times 10^{-3(a)}$
Tetrachloroethylene	$8.9 \times 10^{-3(a)}$
Thallium and Compounds	$4.8 \times 10^{-2(a)}$

Table 24.4-1 (Continued)

Chemical Name	Fish Consumption Criterion (mg/l)
Toluene	4.2×10^2
Toxaphene	$7.3 \times 10^{-7(a)}$
1,1,1-Trichloroethane	1.0×10^3
Trichloroethylene	8.1×10^{-2}
Vinyl Chloride	$5.3 \times 10^{-1(a)}$

^aChemical carcinogen - value presented in the 10^{-6} risk level.

PHASE I CHARACTERIZATION REPORT
VOLUME 1 OF 5

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PHASE I CHARACTERIZATION REPORT
VOLUME 2 OF 5

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